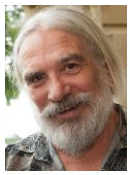
"Climate/Drought Issue for Working Lands in the U.S. Great Plains"

Wind Power from Tribal Lands:

Given the Uncertainties In Hydropower

Bob Gough, Intertribal COUP

8th International Congress for Wildlife
and Livelihoods on Private and Communal Lands
Estes Park, CO September 2014

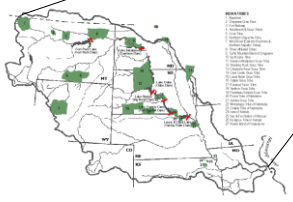


Bob Gough, Esq.
Intertribal Council On Utility Policy
Secretary, IntertribalCOUP.org
Director, NativeWind.org
Senior Advisor, NativeEnergy.com
Member, Western Governors' *Clean and Diversified Energy Advisory Committee*
Westgov.org
Consultant, Wind Powering America Program, Native American Initiative
WindPoweringAmerica.gov

BobGough@IntertribalCOUP.org

DOI Climate Science Centers (**CSC**)

The Interior Department is establishing a series of Climate Science Centers, including one in the North Central region, to help federal, state, local, tribal, and private sector decision-makers understand changes from various environmental stressors and plan in ways that reduce economic and ecological impacts.



A 30 Year Prospective Climate Assessment of the Missouri River Basin would provide an excellent baseline for the North Central Climate Science Center.

Business as Usual In the Upper Great Plains

煤

SOOT

水

WATER

During the Recent Drought:
85% Coal and 15% Hydropower
On the Federal Grid in the UGPR
"Heavily Carbonated-Hydropower"

The Feng-Shui of Renewable Energy

風

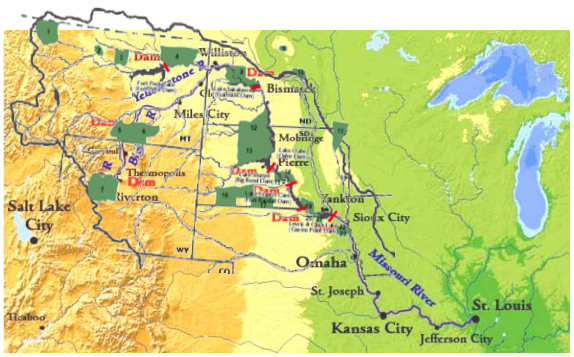
WIND

水

WATER

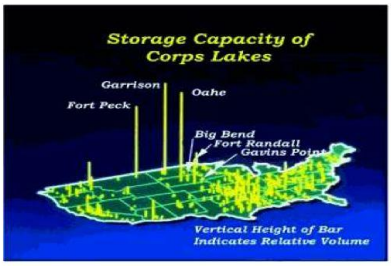
THE POWER OF WIND AND WATER
"A Renewable Energy Dynamo"
In the Upper Great Plains

Trying to Squeeze Wind on a Coal Dominated Transmission System



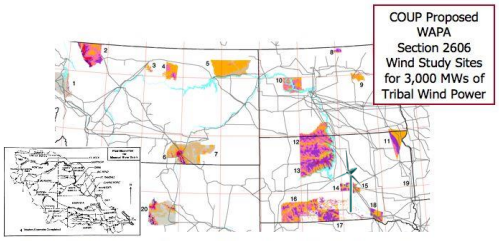
Missouri River Mainstem Dams Provide One of the Largest Hydropower Storage Capacity Systems in the World

The downstream dams at Big Bend, Fort Randall and Gavins Point depend upon utilizing the upstream flow from Fort Peck, Garrison and Oahe. Current climate trends have shifted precipitation from west to east of the dams with far less water entering into the Missouri River behind the dams.



Native Peoples Native Homelands

Wind/Hydro Feasibility Study Area (Section 2606)
Includes Reservation Distributed Generation Sites



Section 2606 authorizes the expenditure of up to $1 million to conduct a wind/hydro feasibility study to evaluate the opportunities for wind/hydro integration throughout the Missouri River Basin to supply power to WAPA 3,000 MWs on 20 Reservations averaging 150 MWs per Reservation.

Native Peoples Native Homelands

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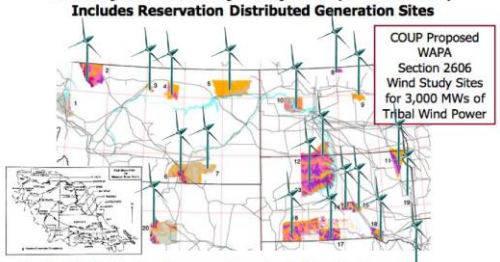

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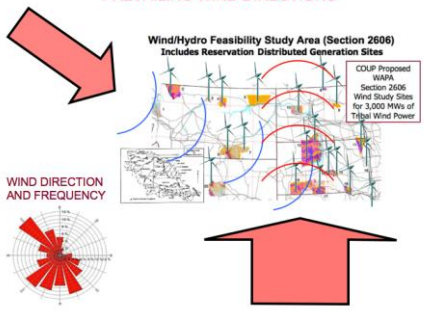
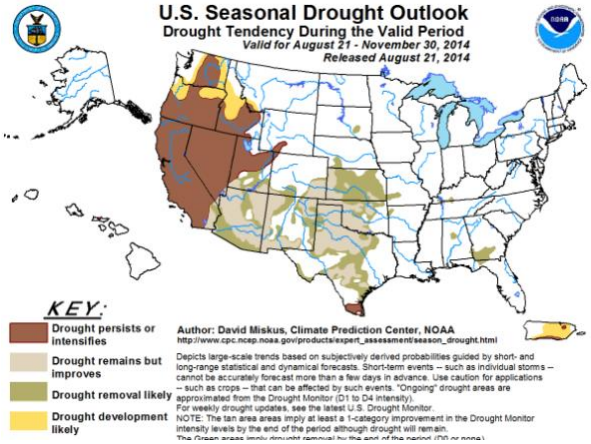
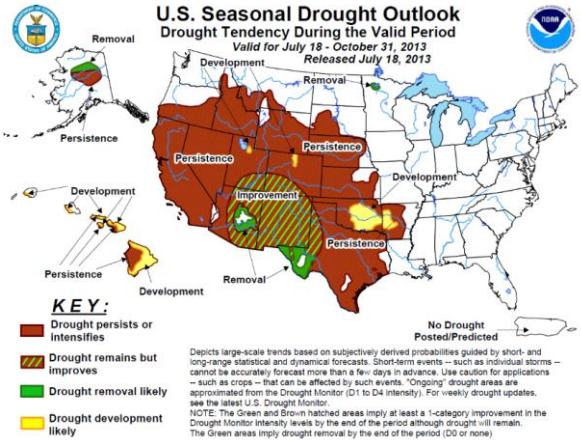
Native Peoples Native Homelands

PREVAILING WIND DIRECTIONS



It's not the WIND that is *intermittent,*
… it is our collection system!!





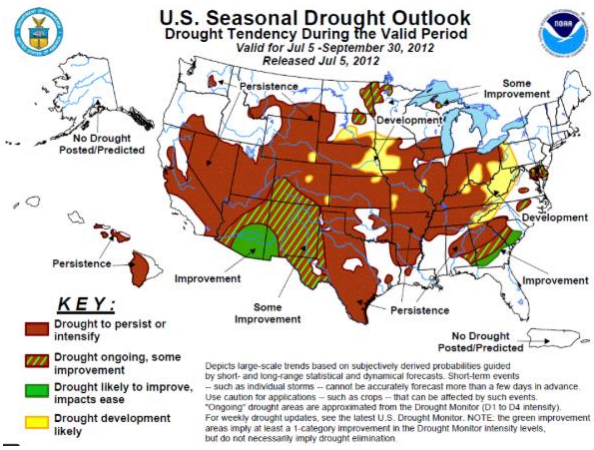
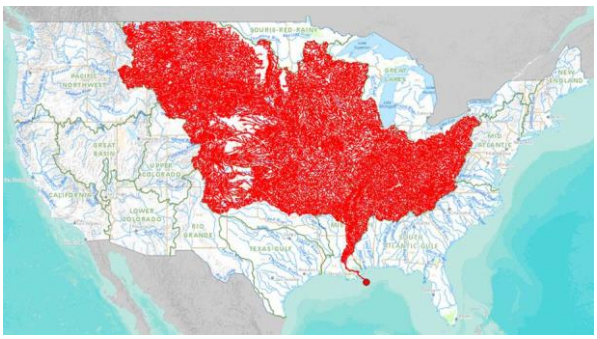


Chart: The 7,000 Streams that Become the Mississippi River

A new tool maps the thousands of connections among U.S. rivers.



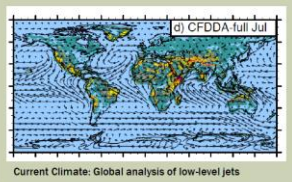
http://www.slate.com/articles/news_and_politics/map_of_the_week/2013/07/chart_tributaries_of_the_mississippi_river.html

METHODOLOGY OVERVIEW

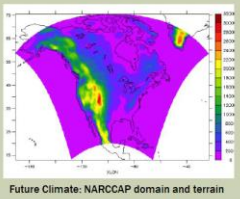
- Utilize state-of-the-art historical climate datasets
  - Climate Four Dimensional Data Assimilation System (CFDDA) or
  - Modern-Era Retrospective analysis for Research and Applications (MERRA)
- Utilize state-of-the-art future climate datasets
  - North American Regional Climate Change Assessment Program (NARCCAP)
- Physically downscale these data into a 4 km regional scale (MRB) dataset and reconcile biases
- Apply the Water Evaluation and Planning Tool (WEAP) to generate current and future water flow

TASK 1: REGIONAL CLIMATE VARIABILITY AND CHANGE ANALYSIS

- ***Goal***: Select an appropriate climatology dataset to represent the Missouri River Basin for both present and future climates, including analysis of wind power variability over a range of temporal and spatial scales.



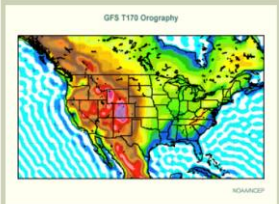
Current Climate: Global analysis of low-level jets



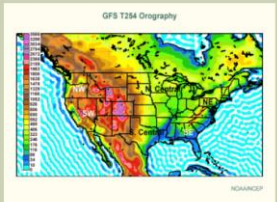
Future Climate: NARCCAP domain and terrain

TASK 2: REGIONAL WIND/SOLAR ENERGY ASSESSMENT

- ***Goal***: Downscale present and future climate datasets to represent details of the Missouri River Basin at 4km resolution.



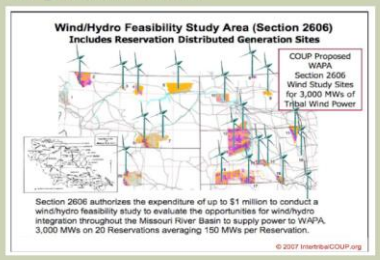
USA orography at ~80-km grid spacing



USA orography at ~55-km grid spacing

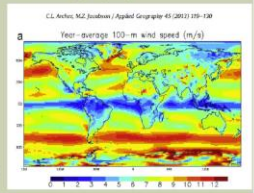
TASK 3: LOCAL WIND ENERGY RESOURCE ASSESSMENT

- ***Goal:*** Assess local wind energy potential for nine or more wind generation sites.



TASK 4: EVALUATE DISTRIBUTED WIND GENERATION SCENARIOS

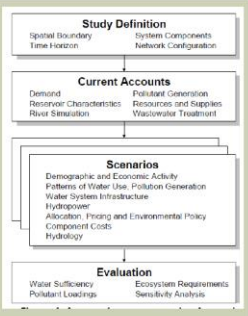
- ***Goal***: Assess the total capacity, reliability, and profitability of interconnected wind farms (up to 20 sites) using the downscaled climatography



PI: Dr. Christina Archer
California State University, Chico (2008-2011)
University of Delaware (2011-2014)

TASK 5: INTEGRATED WATER RESOURCE PLANNING

- ***Goal:*** Analyze the present and future climate impacts on water usage in the Missouri River Basin using the Water Evaluation and Planning (WEAP & LEAP) suite. This analysis will include energy, agriculture, and non-agriculture use over a 30 year period for both current and future climate scenarios.



SUMMARY

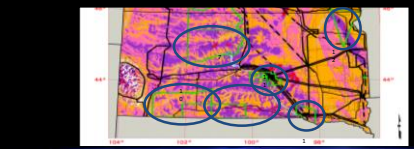
The overarching goal of this work is to assess the "optimal" power generation mix within the Missouri River Basin that will service the user needs while minimizing the carbon footprint.

CLINTON GLOBAL INITIATIVE - AMERICA

The **Clinton Global Initiative-America** has taken a deep interest in working with Indigenous Communities on a variety of issues including:

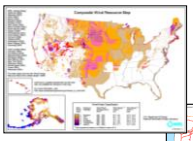
- The Modern Grid
- Renewable Energy
- Sustainable Building
- Workforce Development

SIX SOUTH DAKOTA TRIBES ANNOUNCE FORMATION OF AN INTERTRIBAL WIND UTILITY AUTHORITY AT THE CLINTON GLOBAL INITIATIVE-AMERICA



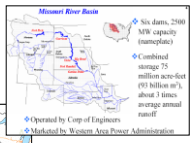
Tribal Wind / Federal Hydropower Renewable Energy Dynamo

World's Largest Hydropower Storage System Could Operate as a Storage Battery



http://www.windpoweringamerica.gov

TransAmerica Generation Grid for Wind/Hydro Dynamo



http://www.solpath.com/luna/admin/documents/NEITS_AWEA_presentation_032904.pdf

New and Upgraded Transmission Needed To Deliver Clean Abundant Wind Power to Load Centers

www.NativeWind.org

IntertribalCOUP.org

Based on renewable wind energy and building affordable, energy efficient housing, using local materials such as straw bales, a sustainable Tribal economy could provide quality jobs and healthy housing for growing reservation populations.

Over one-half of Indian Country is 18 years or younger, and will need both homes and jobs. Why not *create* good jobs building wind turbines and healthy, affordable, and energy efficient homes?